January 10, 2013

Comments on the *Draft Remedial Investigation Report (RI)*, for the San Jacinto River Waste Pits Superfund Site, dated December 2012, provided on behalf of the Port of Houston Authority

On behalf of the Port of Houston Authority (PHA), HDR has reviewed the draft Remedial Investigation (RI) Report (December 2012). Review of the RI was performed concurrent with review of the draft Baseline Human Health Risk Assessment (BHHRA) report; some comments may be repeated or cross-referenced, and some changes recommended to be made in the RI may require consequential changes to the BHHRA. Many prior site documents are referenced in the RI, and comments to the critical documents have been previously submitted to EPA. Where prior comments apparently have not been addressed and warrant emphasis in this RI review, the comments are restated. This review of the RI focuses on analytical methods used, checks for consistency with RI guidance, and verifies representative analyses and the interpretation of results. Where specific changes can be defined, they are recommended. The comments below are referenced to pages and sections of the RI.

General Comments:

- The RI is presented in general accordance with EPA guidance, and the narratives, figures, and tables provide transparency.
- The final approach in EPA's dioxin policy may result in changes in receptor risk estimates.
- Protective Concentration Levels (PCLs) are calculated based on hazard indices of 1 and risks of 10^{-4}, but EPA should be considering any risks greater than 10^{-6} and the fact that PCLs are calculated for individual indices and risks, not combined effects.
- The RI notes for comparison, the groundwater criteria for Texas, but should similarly note standards and guidance for fish tissue, e.g. Texas and FDA fish consumption advisories, and also EPA's values of 51 and 664 ng/kg for dioxins in soil.

Specific Comments:

Section 1.5.4, p. 1-12 l. 8-10 (plus p. 5-69 l. 5, p. 5-72 l. 6, p. 5-73 l. 14-15, p. 74 l. 16, p. 75 l. 17, p. 5-112 l. 1, p. 5-112 l. 19, and several other places in the RI). The phrase "There is no basis for assuming that baseline represents conditions that existed at any time earlier than immediately prior to the TCRA, or that baseline conditions would have continued to exist had the TCRA not been implemented." There is, in fact, a basis for assuming that the pre-TCRA conditions had existed for many years, based on prior sampling in the area and the absence of any condition that would be expected to have changed the condition detailed in the site investigations. Understanding the persistence of dioxins and furans and the general stability of the channel and sediment in the area (as described in the RI and Fate and Transport Modeling report) is the basis for assuming that baseline conditions would have continued, but for the TCRA. The quoted statement has no basis and is not needed for the analyses required in the RI; EPA should require that it be edited to allow that the pre-TCRA condition could have persisted.

Section 2, p. 2-1 last line of first paragraph. EPA should request the referenced data from its sponsors and direct that it be integrated into the interpretation.

Section 3.2. EPA policies (including CERCLA citations) recognize climate change. Since predicted climate change factors such as rise in sea level and peak storm water flow would directly impact the long-term effectiveness of alternative remedies for this site, EPA should require that information on predicted local climate change be included in the RI.

Section 3.3.1, p. 3-7 l. 13. This paragraph should be clarified in reference to Segment 1001. Specifically, does the entire paragraph on advisories apply to only Segment 1001, or to both Segments 1001 and 1005 near the site?

Section 3.5.1.2, p. 3-12. While the discussion of the permeability of the waste is useful, more important is the permeability of materials beneath the waste. Information on any underlying materials that may inhibit the migration of the pore water from the waste should be included.

Section 3.6.2.2.1, p. 3-23 1st full paragraph (and on p. 5-19). The reported underlying aquifer sample has ~10,000 mg/L total dissolved solids (TDS), which water would not be potable by any standards (usually 500 mg/L is used). This upper part of the aquifer is apparently influenced by saline water and may have some breaches in the confining layer reported to be beneath the site. The RPs should provide data to support their confidence that pore water from the waste cannot penetrate into a potable aquifer.

Section 3.8.3, p. 3-29 last paragraph. The text refers to Figure 3-22, which illustrates depths and other data. What is the color code for depths depicted? The label says +23 ft to -55 ft, clearly not the depth range near the site. Please correct or explain.

Section 4 and later sections. As previously commented, use of the upper confidence level on background data as a reference envelope value (REV) sets too high a standard for comparison. Simply stated, our best estimate of background conditions is the mean of background data. For the risk assessments to be conservative, reasonable maximum exposure (RME) values and risks should be compared to the background central tendency exposure (CTE) / mean or median values and its risks. EPA should require that the basis for comparison be changed in the analyses performed. If it is not changed in the RI (and supporting risk assessments), EPA should develop that interpretation.

Section 4.5.3, p. 4-19 l. 10. The paragraph closes with an unproven opinion that should be deleted. If not deleted, a sentence should be added to the paragraph to state that similarly, chemicals of potential concern (COPCs) in background data may be due, in part, to site contaminants.

Section 5.2.1.2.3, p. 5-13 bottom of page. The conclusion that the presence of dioxin-like PCBs in soil is random is unsupported. This sentence should be modified to indicate that the source(s) is not known.

Section 5.2.3.1, p. 5-23 top paragraph. The fact that contaminant concentrations correlate with fines and organic carbon (OC) content is helpful. In reviewing the distribution maps (Figures 5-4, 6, 8), contaminant concentrations at several points appear to be anomalously high or low. If one marks the apparently anomalously low (or high) concentrations, they nearly all are at locations with low (or high) fines and/or organic carbon content. Figures 5-4, 6, and 8 should be labeled to distinguish locations

with high and low fines/OC, so that the distribution figures do not appear to show outliers, but instead convey what the RPs understand of the causes for the distribution. Such labels on data points with low (or high) fines/OC on the toxicity equivalent (TEQ) and mercury figures (Figures 5-4 and 5-8) are especially helpful, but less helpful for PCBs (Figure 4-6). A similar label of low (or high) fines/OC on Figure 4-1 areas where the TEQ exceeds the REV should be included to provide a more coherent understanding of the data.

Section 5.2.3.3, p. 5-26 l. 16-18 (and p. 5-27). While, as hypothesized, the non-detects at 2250 ug/kg (and 26,500 ug/kg on p. 5-27) for PCB analyses might in fact have a much lower concentration, as claimed, elevated detection thresholds instead are frequently associated with some anomaly in the sample, such as another contaminant. Such severely elevated detection threshold analyses should be deleted from all interpretations or their use should be limited.

Section 5.2.3.3.3, p. 5-30 last paragraph. The reference to Figure 5-17 says it portrays TEQ. The graphed data has no label of units on its vertical axis, however, and the vertical axis appears to represent the relative TEQs, as compared to the mean in the Northern Impoundments. On the same Figure 5-17, the EPA perimeter data apparently exclude the Northern Impoundments data. EPA should require explanations and accurate labeling of Figure 5-17.

Section 5.2.4, p. 5-32. (and on p. 5-40) The section fails to note the major uncertainties in tissue contaminant data relating to the size, age, and sex of the specimens; ranges; stomach contents (food sources); and other key variables. For example, TDSHS study *Analysis of Risk from Consumption of Fish Taken from Toledo Bend*, 1995, shows the relationship between fish length and mercury levels at that site. If the fish caught from sampling were half the length of those typically consumed, the measured mercury content used for the tissue risk analyses could be several fold lower than the concentrations consumed by receptors. The uncertainties in the deductions derived from the limited scope of studies performed should be described in more detail.

Section 5.2.4.1.6, p. 5-37 l 11. Reference is made to Figure 5-18, which states that transect locations are on Figure 2-6, but Transects 7 and 8 are not shown on Figure 2-6. Are Transects 7 and 8 located as shown on Figure 5-41?

Section 5.4.1.2, p. 5-54 first full paragraph. The interpretation of Figure 5-24 should provide an explanation for the wide variation in octachlorinated dibenzo-p-dioxin (OCDD) content for the samples with significant TCDD. Additionally, the figure does not show the black circles. The figure and interpretation need to be clarified.

Section 5.5.1. Determination of an appropriate hazard index (HI) for systemic effects and selection of the "acceptable" carcinogenic risk range by EPA should consider the numerous factors that may complicate their application at this site. Additional safety factors may be necessary to ensure that any remedy is protective, given the multiple contaminants, continuing assessment of what constitutes safe levels of these constituents in environmental media and biota, the interactions of these factors in a dynamic environment, and time it will take before positive impacts of the remedial action are evident in, for example, actual levels of contaminants in fish tissue. The uncertainties inherent in such analyses should be clearly stated and considered by the RPs and EPA to assure a protective remedy, regardless of ARARs or standard risk values or ranges.

Section 5.5.1, p. 5-70 l. 10. The RPs repeatedly state in the BHHRA and the RI that 10^{-4} is an acceptable cancer risk, but we understand differently. If any remediation is required, EPA must set the acceptable cancer risk level (between 10^{-4} and 10^{-6}); below 10^{-6} EPA commonly determines that no remedial action is needed. Since some remediation will apparently be required at this site, the BHHRA and the RI should include quantitative risk analyses for receptors with any cancer risk greater than 10^{-6}. The slope factor approach, in addition to the target hazard quotient approach, should be reported, and PCL calculations based on 10^{-6} should be included in the RI.

Section 5.5.2.4, p.5-81 1st paragraph. The uncertainty description does not adequately characterize the uncertainties. Specifically, the bullets should include: the degree to which use of selected biota represent the ecosystem abundance and diversity; the degree to which species selected conservatively represent the ecosystem functions, including threatened and endangered species; and the degree to which specific toxicity data represents the likelihood of effects on abundance and diversity of populations.

Section 5.5.2.5.1 p. 5-81 l. 19-20. The text dismisses concentrations comparable to background. If contaminants originated from the site, they should be subject to evaluation for possible remediation. The text should be revised to recognize that the EPA may require such contaminants to be remediated.

Section 5.5.2.5.1 p. 5-82 l. 12. The RPs should state definitively to what extent Transect 3 has been capped by the TCRA.

Section 5.5.2.5.2, p. 5-82 and throughout the remainder for section 5.5.2. While the term "low" risk fairly conveys a relative level of risk compared to others reported, the term "negligible" conveys a judgment that should be reserved for EPA decision makers. The term "negligible" should be deleted, or the term should be objectively defined.

Section 5.5.2.5.3, p. 5-83 2nd and 3rd paragraphs. The RPs claim that low probabilities of impacts may be dismissed. Sensitive populations (especially threatened or endangered species) and some conditions, however, could result in significant long term impacts from small calculated probabilities of effects, especially in the face of the uncertainties inherent in risk assessments. The RPs should instead indicate that the probabilities should be considered on balance with other evaluations in setting remedial goals.

Section 5.5.2. An overarching concern is that the information from the Baseline Ecological Risk Assessment be used in ways that recognize that, while many of the calculations are designed to be conservative, the risk assessment process has many inherent uncertainties and limitations. The remedial action objectives and the Feasibility Study scope of work should be developed recognizing the inherent uncertainties in the risk assessments.

Section 5.6.3, p. 5-90 2nd paragraph. The Fate and Transport Report in fact estimates that some areas have net erosion and some areas have net deposition. While the isotope dating data are useful, the text of this section fails to provide a balanced description, noting that erosion occurs in some areas and that during high flow conditions and storm surges, different erosion and deposition patterns from those shown by the dating at selected locations, likely occur. The RI should be modified to reflect such limitations on the interpretation of the deposition data presented.

Section 5.6.3, p. 5-90 2nd paragraph. The RI states that vertical profiles of cesium-137 and lead-210 produce a range of net sedimentation rates (NSRs) of 0.4 to 3 cm/year at six of the core locations. However, the cesium-137 data fails to provide any estimate of NSR in any of the eight cores. This statement should be revised to reflect the fact that NSRs at six of the eight cores were based only on lead-210 data. The Fate and Transport Model in fact estimates that some areas have net erosion and some areas have net deposition. The model predictions were within the range of dating NSR in only 1 or 2 of 8 cores. (Comments of August 9, 2012 noted on page 3 of 7, relating to Section 4.3: Model-predicted NSRs fall within the estimated range (min/max) at only 1 of 8 stations for the 21 year simulation (Figure 4-22) and only 2 of 8 stations for the 16 year simulation (Figure 4-23). The statement, "Overall the model predicts sedimentation with reasonable accuracy", is inconsistent with these results. A consistent relationship should be described, or the statement corrected to reflect the reported results. While the isotope dating data are useful, the text of this section fails to provide a balanced description. This section should be revised to note that erosion occurs in some areas and that during high flow conditions and storm surges, different erosion and deposition patterns from those shown by the dating at selected locations, likely occur. The effects of prop wash from tug boats are not evaluated, and should be reported as a limitation on the sediment transport analyses.

Section 5.7.3, p. 5-106 l. 4. References and data are needed to support the claim that other dischargers contribute COCs in sludge and sediment to the EPA perimeter area. Supporting data should be included, or, in the alternative, it should be noted that other outfalls may contribute to the COC levels in the area.

Section 5.8, p. 5-110 et seq. The calculation of protective concentration levels (PCLs) should change if there are changes to the draft BHHRA or earlier sections of the RI.

Section 5.8, p. 5-110 last paragraph. Reference is made here and throughout this section to levels acceptable to EPA. While the RPs assume that HI$\leq$1 and cancer risk level of 10^{-4} are acceptable to EPA, EPA may determine that risks as low as 10^{-6} require response actions. EPA should clarify its risk goal and require the RPs to expand the PCL calculations appropriately.

Section 5.8, p. 5-111 bullets. Some bullets refer to RME exposures and others do not. The bullets should be clarified to define the scope of scenarios used in this section.

Section 5.8.1, p.5-112 1st full paragraph, p. 5-114 l 17, and p. 5-115, bottom. Table 5-11 of the BHHRA shows the contributions of risks from sediment versus fish tissue for each receptor scenario. Whereas sediment (or soil) contaminant concentrations at exposure points might decrease in response to remedial actions, the fish tissue concentrations will not decrease quickly and might decline only after a period of years. Appropriate fractions of 1 (cancer hazard for dioxin) or 10^{-4} (to 10^{-6}) for cancer risks should be used to calculate sediment PCLs, to recognize that tissue hazards and risks will persist subsequent to meeting remedial objectives (e.g. sediment).

Section 5.8.3, p. 5-117 l. 6. The RI should not prejudge EPA's decisions. The language "would not be considered by USEPA to be a human health risk concern" should be deleted and the language "are below the risk levels calculated under the assumptions of the BHHRA" or similar language should be inserted in its place.

Section 5.9.1.3, p. 5-122 1st full paragraph. To be objective and balanced, a closing sentence should be included to state, "Mobile species, especially fish, sampled outside of the EPA site perimeter, are similarly exposed to contaminants originating from the northern impoundments, but assessment of such populations is beyond the scope of this RI/FS."

Section 7. The Remedial Action Objectives focus on surface conditions. The section should also note that EPA will consider subsurface and deeper (core) data in soils and sediment where natural processes (or future uses) such as erosion, barge prop wash, channel meandering, excavations, or other natural or anthropogenic activities may pose risks from the site contaminants.

Any questions concerning these comments should be communicated to Linda Henry, Port of Houston Authority.

Sincerely,

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